



Title	Christmas Tree Fire Tests		
Test Type	Calorimetry		
Lab Number	06L0001-1		
Test dates	12/30/05	No. Tests	3

Fire Products Collector

A Fire Products Collector (FPC) measures several characteristics of a fire based upon the measured properties of the fire plume. A FPC consists of a collection hood connected to an exhaust duct placed over a fire as shown in Figure 1. The primary fire characteristics calculated from a FPC include heat release rate (HRR), convective heat release rate (CHRR), gas species production, and smoke production. HRR measurements are based on the principle of oxygen consumption calorimetry. CHRR is calculated as the enthalpy rise of gases flowing through the FPC. Gas species production is calculated based on the measured gas concentrations flowing through the FPC. Smoke production is quantified based on optical smoke measurements, which measure the attenuation of light as it passes through the smoke and fire gases in the FPC.

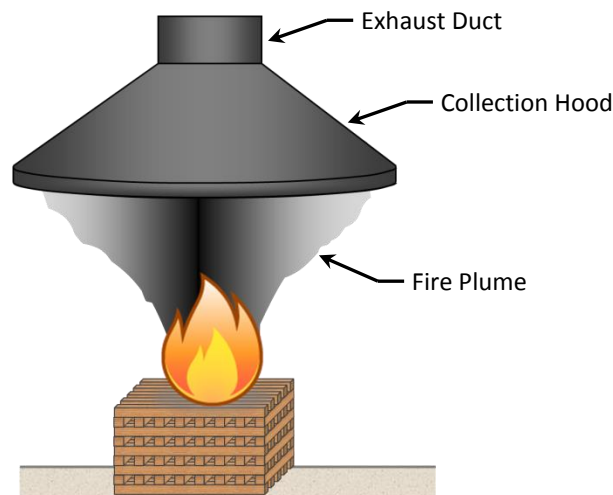


Figure 1. Schematic of a Fire Products Collector

The “Fire Products Collector Description” table identifies which FPC was used in the experiment(s) and summarizes the configuration. Fire Products Collectors were used in accordance with the method defined in FRL Laboratory Instruction “LI011 Fire Products Collectors” [1].

Experiment Photographs

Digital Cameras are used within the FRL to record digital still photographs during experiments. Digital Cameras used during this test series were used in accordance with the method defined in FRL Laboratory Instruction “LI003 Digital Cameras” [2].

Results for Test 1 (ID 1906)

The following table provides a description of the video(s) taken during this experiment.

Table 1. Video Log

Description	Start Time	Filename
Christmas Tree	09:50:44	1906_20051230_095044_1.mp4

The following figures show all of the still photographs uploaded into the FireTOSS system. The caption below each figure provides the picture's filename as well as any description and elapsed test time associated with the picture.



Figure 2. PRE (0:7 hr:min),
1906_29245, True



Figure 3. 42,
1906_29246, True



Figure 4. 49,
1906_29247, True



Figure 5. 58,
1906_29248, True



Figure 6. 68,
1906_29249, True



Figure 7. 79,
1906_29250, True



Figure 8. 91,
1906_29251, True



Figure 9. 104,
1906_29252, True



Figure 10. 117,
1906_29253, True

Results for Test 2 (ID 1907)

The following table provides a description of the video(s) taken during this experiment.

Table 2. Video Log

Description	Start Time	Filename
Christmas Tree	09:57:39	1907_20051230_095739_1.mp4

The following figures show all of the still photographs uploaded into the FireTOSS system. The caption below each figure provides the picture's filename as well as any description and elapsed test time associated with the picture.



Figure 11. PRE (0:1 hr:min),
1907_29254, True



Figure 12. PRE (0:1 hr:min),
1907_29255, True



Figure 13. POST (0:1 hr:min),
1907_29257, True



Figure 14. POST (0:1 hr:min),
1907_29258, True



Figure 15. POST (0:1 hr:min),
1907_29260, True

Results for Test 3 (ID 1908)

The following table provides a description of the video(s) taken during this experiment.

Table 3. Video Log

Description	Start Time	Filename
Christmas Tree	10:03:34	1908_20051230_100334_1.mp4

The following figures show all of the still photographs uploaded into the FireTOSS system. The caption below each figure provides the picture's filename as well as any description and elapsed test time associated with the picture.



Figure 16. 13,
1908_29233, True



Figure 17. 17,
1908_29234, True



Figure 18. 36,
1908_29235, True



Figure 19. 49,
1908_29236, True



Figure 20. 67,
1908_29237, True



Figure 21. 78,
1908_29238, True



Figure 22. 81,
1908_29239, True



Figure 23. 82,
1908_29240, True



Figure 24. 114,
1908_29241, True



Figure 25. 136,
1908_29242, True



Figure 26. POST
(0:00 hr:min),
1908_29243, True



Figure 27. POST
(0:00 hr:min),
1908_29244, True



Figure 28. POST
(0:15 hr:min),
1908_29261, True



Figure 29. POST
(0:16 hr:min),
1908_29262, True

Results Summary

The following chart shows the heat release rate of the fire during the experiment. The heat release rate is calculated based on the principle of oxygen consumption calorimetry.

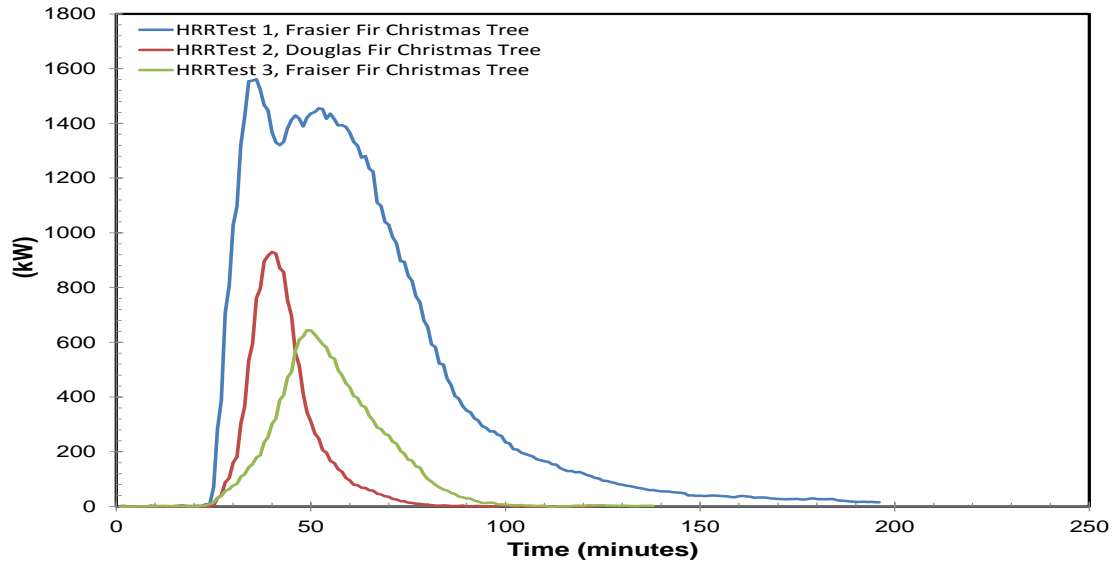


Figure 30. Heat Release Rate

References

1. Laboratory Instruction – Fire Products Collectors – LI011, Bureau of Alcohol, Tobacco, Firearms and Explosives – Fire Research Laboratory, Beltsville, MD.
2. Laboratory Instruction LI003 - Digital Cameras, Bureau of Alcohol, Tobacco, Firearms and Explosives - Fire Research Laboratory, Beltsville, MD